

# Proseminar Condensed Matter Physics (74117-01 4KP)

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proseminar	Thursdays, 12:15-14:00, alter HS2
prerequisites	physics 1-4, condensed matter, quantum mechanics
syllabus	selected topics of condensed matter
participants	choose a topic and presents it to class, e.g. powerpoint, 30 min. + discussion
hand in	slides of talks (pdf preferred), 2 page summary (pdf from LaTeX (preferred))
learning goals	- selected topics in CM (more advanced than the fall intro class) - presentation skills (incl. English) - discussion skills - literature search
TAs	will guide students through preparation of talk and 2-page summary
language	English

## Dates

Feb 20	1 <sup>st</sup> meeting, alter HS2
Mar 3	email Dominik topic of choice plus an alternative.
Mar 6	Assignment of topics and TAs
Apr 24, May 8, 15, 22	presentations
grades	number grades 1-6, feedback forms (students, TAs) preparation is a considerable effort (4KP), 2nd attempt possible

## TAs

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## topics

quantum hall effect	2D electron gases	electron spin qubits
spin-hall effect	transistors (Si, MOS, finFET etc)	hole spin qubits
Mott transition	solar cells	superconducting qubits
magnetism	conductance fluctuations	microwave resonators
superconductivity	weak localization	qubit readout
Josephson effect	spin-orbit coupling	persistent spin helix
superfluidity	Aharonov-Bohm effect	nuclear spins
topological insulators	conductance quantization	quantum materials
Majorana fermions	Coulomb blockade	graphene
quantum computation	quantum dots (transport)	2D materials (TMDCs, VdW, ...)
Andreev reflection	Kondo effect	adiabatic demagnetization
thermometry	noise	tunnel junctions